

# **The Puget Sound Ambient Monitoring Program**

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## **Introduction to the PSAMP**

The Puget Sound Ambient Monitoring Program (PSAMP) is a long-term, comprehensive program to assess the health of Puget Sound and its resources. Approximately 10 years ago, PSAMP was initiated to evaluate the effectiveness of the Puget Sound Water Quality Management Plan, to assess long-term trends in environmental quality, and to improve decision-making and prevent overlaps and duplication in monitoring efforts.

The PSAMP is implemented as coordinated studies by Washington State Departments of Ecology, Fish and Wildlife, Health, and Natural Resources, King County's Department of Natural Resources, and the U.S. Fish and Wildlife Service. The Puget Sound Water Quality Action Team coordinates the program with the assistance of representatives of the implementing agencies and the U.S. Environmental Protection Agency.

Through the studies that comprise the PSAMP, data on marine and fresh waters, fish, sediments, and shellfish in Puget Sound have been collected since 1989; surveys of nearshore habitat have been conducted since 1991; marine bird populations have been surveyed since 1992; and marine bird contamination has been studied since 1995.

## **PSAMP Findings Presented at Puget Sound Research '98**

The results of PSAMP studies and the relevant work of other scientists are used to address five aspects of the health of Puget Sound: biological resources, physical environment, toxic contaminants, pathogens and nutrients, and human health threats. Results in each of these areas were presented at the 1998 Puget Sound Research Conference.

### **Biological Resources**

PSAMP develops information about the state of Puget Sound's biological resources through a number of studies. PSAMP studies do not evaluate the condition of marine or anadromous fish resources or shellfish stocks. Results from PSAMP studies presented at Puget Sound Research '98 included the following:

#### ***Marine Birds***

- Status and Trends for Selected Diving Duck Species Examined by the Marine Bird Component of PSAMP (Nysewander and Evenson)

#### ***Marine Mammals***

- Disease Screening of Harbor Seals (*Phoca vitulina*) from Gertrude Island, Washington (Lambourn et al.)

#### ***Nearshore Vegetation***

- Floating Kelp Resources in the Strait of Juan de Fuca and along the Pacific coast of Washington (Mumford et al.)
- Mapping Shorelines in Puget Sound II. Linking Biota with Physical Habitats (Dethier and Schoch)

### ***Puget Sound Research '98***

- Mapping Shorelines in Puget Sound III. Management Applications for Inventory and Monitoring (Berry et al.)
- Puget Sound Intertidal Habitat Inventory: Vegetation Mapping (Ritter and Bailey)

### ***Benthic Macroinvertebrates***

- The Distribution and Structure of Soft-bottom Macrobenthos in Puget Sound in Relation to Natural and Anthropogenic Factors (Llanso)
- Marine Benthic Invertebrate Communities near King County's Wastewater Outfalls (Laetz)

## **Physical Environment**

PSAMP studies address the status of, and changes in, the Sound's physical environment, especially the Puget Sound shoreline and the physical character of Puget Sound's marine waters.

### ***Shoreline***

- Mapping Shorelines in Puget Sound I. A Spatially Nested Geophysical Shoreline Partitioning Model (Schoch and Dethier)
- Probability-based Estimation of Nearshore Habitat Characteristics (Berry et al.)
- Puget Sound Intertidal Habitat Inventory: Shoreline Characteristics Mapping (Bookheim and Berry)

### ***Marine Water Physical Character***

- "The Puget Sound Signal" in the public evening session on Local Effects of El Niño (Newton)
- Variations in Residence (Flushing) Time in the West Bay of Budd Inlet, 1992-1994 Hydrographic Studies (Albertson et al.)
- Assessing Sensitivity to Eutrophication Using PSAMP Long-term Monitoring data from the Puget Sound Region (Newton et al.)

## **Toxic Contaminants**

A major focus of the PSAMP over the years has been on the distribution and effects of toxic contaminants in Puget Sound. PSAMP findings presented at the 1998 Puget Sound Research Conference include the following:

### ***Sediments***

- Toxicity of Sediments in Northern Puget Sound-A National Perspective (Long and Dzinbal)
- Response of the P450 RGS Bioassay to Extracts of Sediments Collected from Puget Sound, Washington (Anderson et al.)

### ***Shellfish***

- Trace Metal Contamination in Edible Clam Species from King County Beaches (Stark)

### ***Fish***

- Factors Affecting the Accumulation of Polychlorinated Biphenyls in Pacific Salmon (O'Neill et al.)
- Persistent Pollutants and Factors Affecting Their Accumulation in Rockfishes (*Sebastes* spp.) from Puget Sound Washington (West and O'Neill)
- Geographic and Temporal Patterns in Toxicopathic Liver Lesions in English Sole (*Pleuronectes vetulus*) from Puget Sound and Relationship with Contaminant Concentrations in Sediments and Fish Tissues (O'Neill et al.)

### ***Marine Birds and Mammals***

- Contaminant Monitoring of Surf Scoters near Tacoma, Washington (Mahaffy et al.)
- Elevated PCB Levels in Puget Sound Harbor Seals (*Phoca vitulina*) (Ross et al.)

### **Pathogens and Nutrients**

PSAMP studies investigate water quality problems related to pathogens (as indicated by fecal contamination) and excess nutrient loadings. Results of PSAMP studies in these areas reported at the 1998 Puget Sound Research Conference include the following:

- Long-term Trends in Fecal Coliform Levels in Three South Puget Sound Bays and Links to Watershed Remedial Action (Determan)
- Variation in Primary Productivity of Budd Inlet (Newton et al.)
- Sources of Variability in Water Quality Monitoring Data (Edinger)

### **Human Health**

The PSAMP investigates toxic contaminants, pathogens, and paralytic shellfish poisoning (PSP) toxins as human health threats in the Puget Sound environment. Results from studies of toxic contaminants and pathogens are listed above. One paper on PSAMP's monitoring of PSP was presented at this conference:

- Temporal and Spatial Distribution of PSP Toxin in Puget Sound (Determan)

### **PSAMP Reports**

In addition to presenting results at Puget Sound research conferences and at other scientific meetings, the PSAMP communicates its findings through the following publications:

- Agency reports—as part of the participation in the PSAMP, member agencies all produce and disseminate technical reports on their PSAMP efforts. These reports are the primary publications of PSAMP findings.
- *Puget Sound Update*—the sixth Update (1998) has recently been completed. This report is intended to be accessible, yet comprehensive documentation of recent findings of the PSAMP. New editions of the Update will be produced every two years.
- *Puget Sound Notes*—an occasional, technical newsletter for Puget Sound scientists.
- *Sound Waves*—a bi-monthly or quarterly newsletter for citizens of the Puget Sound region. Since late 1996 this newsletter includes a page devoted to recent findings of the PSAMP on the health of Puget Sound.

***Puget Sound Research '98***

Data developed from PSAMP studies are also available. Various electronic and hard copy formats are available via request to the principal investigator. Contact Puget Sound Water Quality Action Team staff for information about whom to contact for various data sets or visit the Action Team's Web site at [http://www.wa.gov/puget\\_sound](http://www.wa.gov/puget_sound).